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Research Article

PSYCHOSOCIAL MOOD SYMPTOMS; A COMMON PRESENTATION IN THYROID DYSFUNCTION

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ABSTRACT

Aims and objective: This research aims at investigating the mood related consequences of thyroid dysfunction that could hint an underlying psychosocial mood disorder.

Methods: This cross sectional study was conducted in the Medical and Psychiatry OPD at Ruth K.M. Pfau Civil Hospital, Karachi during October 2018 to May 2019. Individuals aged between 20 and 60 years, attending the outpatient department, with some nonspecific mood complain were included while those with diagnosed psychiatric or thyroid disorder were excluded. All patients were followed with the measurement of TSH, Hb, ALT, ALP and RBS.

Results: Among 100 participants who completed the questionnaire. Mean age of 20 ± 1.7 years. Mood swings and thyroid level shown a statistically significant association ($p=0.047$). When asked for symptoms they felt, a significant association was established between dizziness ($p=0.031$) and weight change ($p=0.054$). Additionally, thyroid levels in different age groups when compared show a remarkable association.

Conclusion: This study establishes a positive relation of thyroid dysfunction with mood disorder symptoms, hence the authors conclude that thyroid profile plays a pivotal role in the pathogenesis and management of patients with mood derangements (or an underlying psychosocial mood disorder), and is related to the overall prognosis of such patients. Much more definite work needs to be done in this domain in the future for further validation.

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INTRODUCTION

Thyroid gland and its physiological role in the human metabolism plays a pivotal role, and, its disorders are some of the most researched, yet ironically have some of the most inconclusive results. Thyroid dysfunction has been directly implicated to mood derangements, and multiple psychiatric illnesses. However contradictory data exists on whether thyroid derangements are a part of nonspecific mood alterations and symptoms that could hint an underlying psychosocial mood disorder. Amongst the wide range of physiological impacts of thyroid hormones on different systems on the body, it also has been found to influence the psychiatric stability and status of an individual. Moreover, both hyperthyroidism and hypothyroidism have been found to exhibit psychiatric manifestations, including depression, mania, anxiety and, in severe derangements, psychosis as well(8, 9) Keeping in view, understandably evaluating thyroid profile in patients with psychiatric symptoms seems vital, has also proven by studies, including a study conducted in North east India by Hazarika.J et.al that elaborated the vital role of

thyroid profile in management of psychiatric illness(10) Extensive research and literature is available regarding effects of thyroid on the major systems, but literature pertaining to its particular correlation with psychosocial disorders, is ambiguous. The DSM-V classified disorders, and majority have a psychosocial factor pertaining to it, including anxiety, schizophrenia, somatoform disorders and more(11). While some sources clearly disregard a correlation between thyroid and psychosocial mood disorders,(12, 13) whereas, on the contrary, others establishing a relation between thyroid dysfunction and psychosocial disorders and quality of life(11, 14)

Keeping in view this ambiguous literature, as well as paucity of literature within our local setting, the main aim of our study is to study thyroid hormone derangements in individuals presenting with symptoms of any of the psychosocial mood disorders outlined by the DSM-V, in a public hospital in Karachi.

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OBJECTIVE

The main objective of our research is to study thyroid profile derangements in individuals presenting with symptoms of any of the psychosocial mood disorders symptoms outlined by the DSM-V, in a public hospital in Karachi.

METHODS

This cross sectional study was conducted in the Medicine and Psychiatry OPD of Ruth K.M.Pfau Civil Hospital, Karachi from October 2018 to May 2019. Sample size was calculated using Open Epi software keeping anticipated frequency of 26%, gave the total sample to be **100**.

Inclusion Criteria

All the individuals between 20 and 60 years of age of either sex with some non-specific mood derangements, willing to partake in the study after giving viable consent.

Exclusion criteria

Patients already diagnosed with a psychiatric disorder, or thyroid disorders were excluded. Moreover, patients who didn't give voluntary consent were also excluded from the study.

Participants were enrolled only after taking informed, verbal and signed consent. A face to face interview was conducted using a self-designed questionnaire. A pilot study was conducted to assess the validity of questionnaire, and correct errors in the data collection technique.

All patients were subjected to have thyroid stimulating hormone, hemoglobin, random blood sugar and alanine amino transferase and alkaline phosphatase.

Data was entered and assessed using Statistical Package for Social Sciences (SPSS) version 23. Frequencies were tabulated, and mean calculated for lab parameters. Lab parameters were compared with symptoms, using the T test, whereas categorical variables were cross tabulated using the Chi-square test. A p-value of less than 0.05 was considered significant

RESULTS

Out of **100** individuals who completed the form [n=76, %] were female. Mean age among these patients was **20 ± 1.7** years.

On comparing the TSH level with different symptoms with the help of Chi square, there was a significant association seen among mood swings and TSH level with a p value of 0.047. While participants feeling depressed and low showed no statically significant association (p=0.210). The rest is tabulated in Table 1.

When questioned for symptoms they felt, significant association was found between dizziness (p=0.031) and weight change (p=0.054) (Table 1).

We further extend our result by comparing thyroid levels in different age groups, shows a significant relation when compare as in table 2

To further describe our result we compare TSH level with all other labs test results, where no significant association was recognized but an inverse relation was built between TSH and

hemoglobin (p=0.176) level also with Alkaline phosphatase (p=0.325) showing an insignificant relation too. (Table 3)

Table 1 Responses of participates of different thyroid level with different symptoms

		Hypothyroidism	Normal	Hyperthyroidism	p-value
Has there been any major life events in previous 3 months (birth, death, divorce)	Yes	0	5 (100%)	0	0.476
	No	4 (4.2%)	73 (76.5%)	18 (18.9%)	
Have you had any mood swings recently	Yes	2 (2.6%)	65 (83.3%)	11 (14.1%)	0.047
	No	2 (9.1%)	13 (59.1%)	7 (31.8%)	
Do you feel depressed or hopeless on trivial matters	Yes	2 (2.6%)	60 (76.8%)	16 (20.5%)	0.210
	No	2 (9.1%)	18 (81.8%)	2 (9.1%)	
Do you often feel anxious	Yes	3 (3.3%)	70 (77.8%)	17 (18.9%)	0.496
	No	1 (10%)	8 (80%)	1 (10%)	
Do you feel tired or lethargic all the times	Yes	3 (3.4%)	66 (75.9%)	18 (20%)	0.166
	No	1 (7.7%)	12 (9.3%)	0	
Do you feel difficulty in enjoying things do you often lose your temper	Yes	1 (1.6%)	48 (78.7%)	12 (19.7%)	0.298
	No	3 (7.7%)	30 (76.9%)	6 (15.4%)	
Do you have any difficulty in recalling things	Yes	0	43 (86%)	7 (14%)	0.058
	No	4 (8%)	35 (70%)	11 (22%)	
Have you ever had any suicidal/ homicidal thoughts	Yes	0	13 (86.7%)	2 (13.3%)	0.580
	No	4 (4.7%)	65 (76.5%)	16 (18.8%)	
Do you have any difficulty in concentration	Yes	2 (6.5%)	24 (77.4%)	5 (16.1%)	0.685
	No	2 (2.9%)	54 (78.3%)	13 (18.8%)	
Do you feel any symptoms like					
Fainting	Yes	1 (3.4%)	24 (82.8%)	4 (13.4%)	0.758
	No	3 (4.2%)	54 (76.1%)	14 (19.7%)	
Palpitation	Yes	1 (1.6%)	49 (80.3%)	11 (18.0%)	0.319
	No	3 (7.7%)	29 (74.4%)	7 (17.9%)	
Generalized body ache	Yes	3 (3.3%)	72 (78.6%)	17 (18.5%)	0.422
	No	1 (12.5%)	6 (75%)	1 (12.5%)	
Illness induce anxiety	Yes	0	17 (77.7%)	5 (22.7%)	0.477
	No	4 (5.1%)	61 (78.9%)	13 (16.7%)	
Dizziness/ light headache	Yes	1 (1.3%)	63 (81.8%)	13 (16.9%)	0.031
	No	3 (13.0%)	15 (65.2%)	5 (21.7%)	
Alter sleep	Yes	1 (1.9%)	42 (77.8%)	11 (20.8%)	0.423
	No	3 (6.5%)	36 (78.5%)	7 (15.2%)	
Alter bowel habit	Yes	2 (6.7%)	23 (76.6%)	5 (16.5%)	0.666
	No	2 (2.9%)	55 (78.9%)	13 (18.3%)	
Weight change	Yes	2 (7.4%)	24 (88.9%)	1 (3.7%)	0.054
	No	2 (2.7%)	54 (74.0%)	17 (23.3%)	

Table 2 comparing variable thyroid level with different age groups

Age	Hypothyroidism	Normal	Hyperthyroidism	p-value
20-30	0	4 (87.5%)	2 (12.5%)	0.039
31-45	0	0	35 (83.3%)	7 (16.7%)
46-60	2 (5.9%)	2 (5.9%)	24 (70.9%)	8 (23.5%)
>60	2 (25%)	2 (25%)	5 (62.5%)	1 (12.5%)

Table 3 Correlation of TSH level with other Lab parameters

Independent variable	Dependent variable	Co-relation	p-value
TSH level	RBS level	0.192	0.149
TSH level	Hemoglobin level	-0.142	0.176
TSH level	Alkaline phosphatase	-0.197	0.325
TSH level	ALT level	0.070	0.552

DISCUSSION

The clinical implications of thyroid hormones in mood disorder have been studied extensively and still remains disputable (15). Even though thyroid disorders are associated with psychiatric symptoms in clinical populations, extent of a similar association in general population is less certain .A group of investigators at Copenhagen conducted prospective cohort studies to determine the association between thyroid and affective disorders, giving positive results (16, 17). in a research conducted in India there was an intimate relation between Mood disorders and suboptimal thyroid function too (18). Moreover, the most recent ultrasensitive immunoradiometric assay for detecting thyroid dysfunction is TSH (19).Therefore, Our clinical trial also uses TSH levels for establishing a relation with mood swings.

Overt or subclinical Hypothyroidism, appears to the commonest abnormality found in bipolar disorder. The most common psychiatric indication related to hypothyroidism are depression and cognitive dysfunction (18). Both the symptoms of hypothyroidism and hyperthyroidism may be presented with various neuropsychiatric manifestations including mild depression disorders, anxiety and overt psychosis. In our study it is clearly shows that apart from majority of euthyroid patients, more patients presented with hyperthyroidism as compared to the number of hypothyroid patients. There was no statistically significant relation between major life event such as divorce, death or birth. While mood swings and thyroid level has shown a statistically significant association. Difficulty in recalling things, dizziness/light headedness and weight changes also shows significant results. This shows that disturbance in TSH levels can lead to affective disorders such as bipolar disorder

Male patients presented significantly higher TSH levels and better clinical improvement (22). In contrast to their study, our randomized clinical trial surprisingly shows that higher TSH levels were found in females patients (18.4%) as compared to males (16.7%). Whereas low TSH levels (hypothyroidism) were more prevalent in males (4.2%) as compare to females (3.9%). So the authors hypothesize that gender related differences of TSH levels may be connected with different metabolism and requires further investigation. (Refer to table 1). In our population levels of TSH was between references values in each individual, so far undiagnosed, thyroid disorder were not apparent.

Biondi B *et al.* reported that the commonness of thyroid disorders rises with age. They become common in individuals aged 60 years and older (23). In contrast to their findings, our study shows that all the age groups presented with hyperthyroidism more commonly with the exception of age group 60 and above, where hypothyroidism is more prevalent (25%). Among the hyperthyroid patients, the most pervasive age group was 46-60 years (23.5%) while in the same age group the hypothyroid patients were just 5.9%. (Refer to table 5).

A study by Hong w j *et al.* shows that a pattern of euthyroid hyperthyroxinemia is significantly more common in patients with a mood disorder and in Colorado, thyroid disease prevalence study shows that low mood disorder is a poor predictor of hypothyroidism (26) which is consistent with the results of our study in which there was a statistically significant relation between mood swings and thyroid symptoms. We further investigated that the symptom of mood swings were more prevalent in the patient of hyperthyroidism (14.1%) as compared to hypothyroidism (2.6%) (27).

A study conducted by d fang *et al.* found patients with hyperthyroidism had executive function and could not inhibit impulsive behavior (28), but Vogels study revealed no cognitive impairment in patients with Graves's thyrotoxicosis using comprehensive neuropsychological testing. Emotional disturbance of patients with acute untreated hyperthyroidism have been reported in early time (29). Our results were contrary to these studies, where patients of hyperthyroidism had more affective symptoms both of depression (20.5%) and anxiety (18.9%).

In a study at UK, aimed at evaluating the mental health in general practice, patients referred for thyroid function test had

a higher rate of psychological morbidity than seen in all presentations (54.2 vs. 19%), suggesting that psychiatric symptoms were a common reason for assessing thyroid function (30) Contrary to this studies, our results clearly show that there is no statistically consequential relation

Limitations and Future Recommendations

This research according to the best of our knowledge is the first of its kind in our setup and has attempted to explain the complex relationships among the symptoms of mood disorders and TSH levels in addition to the relationship between TSH and levels of ALT, RBS and hemoglobin, The main strength lies in the fact that authors did not solely rely on the patients symptomatology, but included lab investigations for a broader explanation of the results.

These include the usage of self-administered questionnaire instead of a standard one. An important limitation in this regard is differences in thyroid hormone metabolism between male and female patients and low sample size may have confounded our results. Although current research, especially preclinical, research has provided strong leads it is further recommended that more factors should be incorporated to find out the probable relation between the two. The authors also recommend that future researches should be done with a higher sample size and should necessarily incorporate both free t4 and t3 levels in addition to TSH levels for better understanding of the possible complex interplay between these hormones and mood disorders. The authors also recommend that future researches in this regard should have an equal number of male and female participants, which will lead to more authentic results about the relationship between gender and thyroid problems.

CONCLUSION

This study reveals a statistically significant relation between mood swings and thyroid levels. The researchers of this study conclude that mechanisms, by which thyroid dysfunction produces mood symptoms, remain to be more fully elaborated and understood. Studies among depression are more prevalent than those of mood disorder in our set up and that more research should be done in this subject. Therefore, more methodologically stable studies among clinical studies are required to assess potential interactions between these neurochemical systems in the CNS and thyroid functions.

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